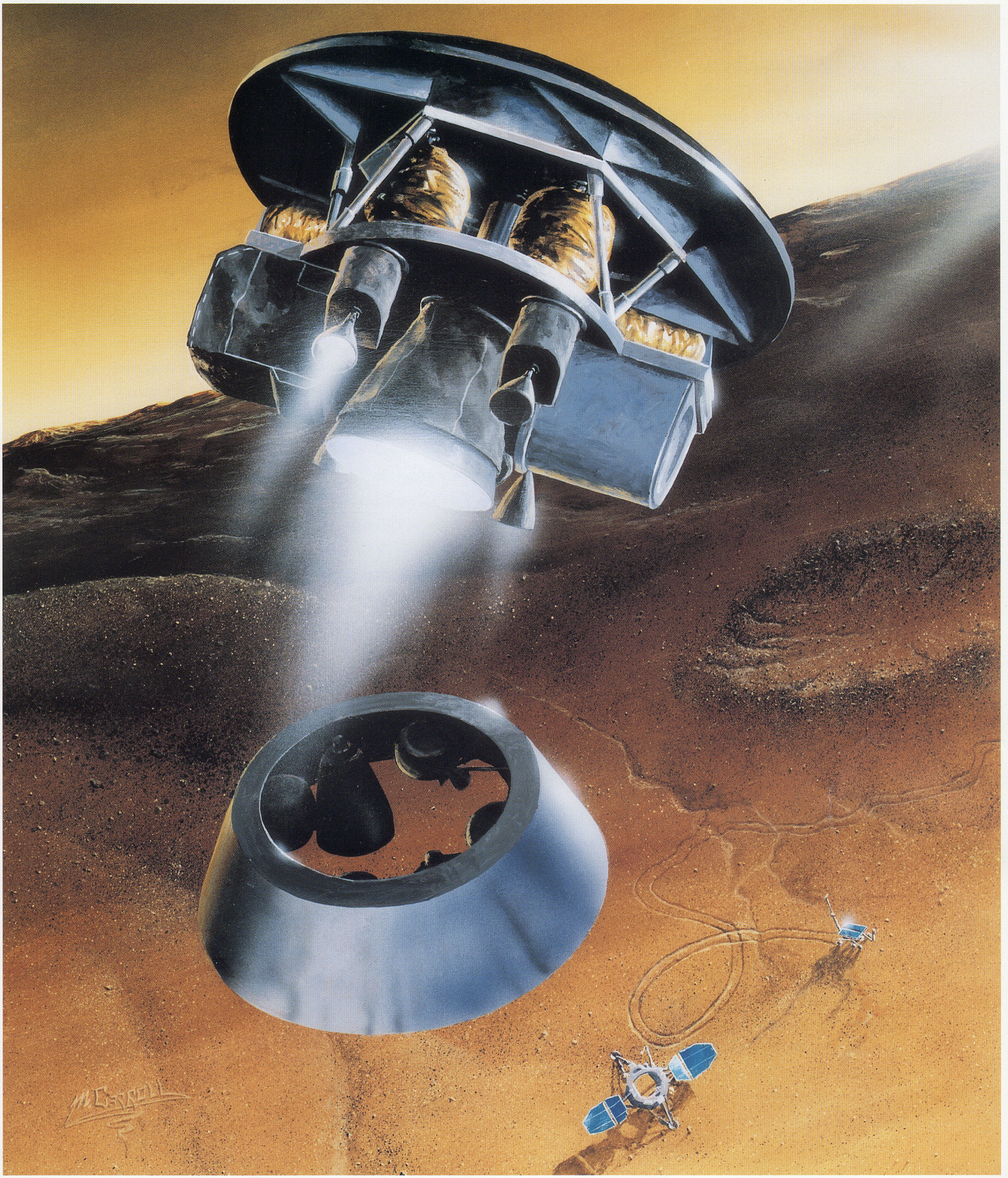
MARS SAMPLE RETURN MISSION



Mars Sample Return Mission
(P-48816)

Does life exist elsewhere in our universe, or are we alone? The discovery of life elsewhere than on Earth would suggest that it is a natural consequence of the way things work. Finding life that originated independently from life on Earth would prove that life can develop anywhere in the universe given the right conditions — and that it probably has done so countless times.

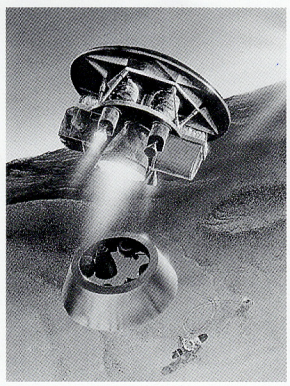
Mars is perhaps the best place in our solar system to begin to search for evidence of life beyond Earth. Unlike today, Mars is believed to have been warm and wet at the same time that life made its first appearance on Earth, about 3.8 to 3.5 billion years ago. Life appeared on Earth almost immediately (in a geological sense) after the heavy bombardment by space rocks ended. This bombardment, lasting between 400 and 500 million years, had made Earth's surface a rather inhospitable place for fledgling life. In other words, life developed on Earth as soon as it had a chance. Since ancient Mars experienced similar conditions to an ancient Earth that harbored life, it is possible that life could have developed on Mars as well.

There are two methods for finding evidence of Martian life. The first method is to send a spacecraft loaded with scientific equipment and specialized tools to search the Martian surface for life. Unfortunately, the spacecraft's scientific equipment would not be able to answer all or even most of the questions and concerns raised by the scientific community when questioning and challenging evidence of life. Another spacecraft would have to be sent every time a scientific question was raised. The second, more cost-effective method is a "Mars Sample Return" mission. By returning samples of the Martian surface to study here on Earth, the best equipment and talent available in the world can be brought to bear on the challenge of deciphering Martian history.

The meteorites from Mars that have been discovered on Earth have provided a wealth of information about the Martian atmosphere, hydrosphere, and even the planet's evolution. However, there are significant limitations to using such meteorites in determining Martian history or evidence of life on Mars. These meteorites are from unknown and random locations on Mars, sites not necessarily the most likely to provide concrete evidence of life. Furthermore, Martian meteorites are not representative of the Martian surface — meteorites discovered thus far have been subsurface igneous rocks and not surface soils or sediments.

A carefully targeted mission to Mars can return samples from the ancient cratered highlands, the most likely place for evidence of life to have been preserved. The sample would contain rocks, soil, and atmosphere that will be far more able to answer questions about Martian life and history than any meteorites or instrumented spacecraft could. Returning samples from Mars would also bolster the possible future human exploration of Mars, and promises to be one of the most challenging and scientifically interesting space missions to be attempted in the next decade.

A Mars Sample Return mission will continue the long-term program of Mars exploration being conducted by the National Aeronautics and Space Administration's (NASA's) Office of Space Science. The Jet Propulsion Laboratory, a division of the California Institute of Technology, manages the Mars Exploration Program for NASA.



About the image —

An artist's rendering of a two-stage Mars ascent vehicle blasting off from the Martian surface. On board is approximately 0.3 kilogram (0.7 pound) of Martian rocks, soil, and atmosphere that will be returned to Earth for scientific analysis.

National Aeronautics and Space Administration

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JPL 400-755 5/98